30. Find the pts. (x, y)

$y = \tan x \quad -\frac{\pi}{2} < x < \frac{\pi}{2}$

tan line $\parallel$ $y = 2x$

$y' = $ slope $= 2$

solve $\sec^2 x = 2$

$\frac{1}{\cos^2 x} = 2$

$\cos^2 x = \frac{1}{2}$

$\cos x = \sqrt{\frac{1}{2}}$

$\cos x = \frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$

$\cos x = \frac{\sqrt{2}}{2}$

$x = \frac{\pi}{4}$ or $-\frac{\pi}{4}$

$y = 1 \qquad y = -1$

Sep 21-9:29 AM

3.6a Chain Rule

Use chain.tns to discover the amazing chain rule for derivatives of composite functions. – function of a function

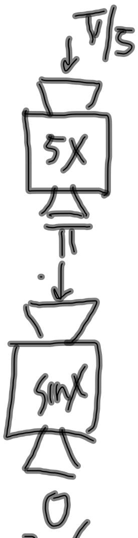
$y = \overset{\text{out}}{\sin}(\overset{\text{in}}{5x})$

$y = f(g(x))$

in $g(x) = 5x$

out $f(x) = \sin x$

$y' = 5\cos(5x)$



$x = \frac{\pi}{5}$

$g\left(\frac{\pi}{5}\right) = \pi$

$f(\pi) = 0$

$f\left(g\left(\frac{\pi}{5}\right)\right) = 0$

$$\frac{d}{dx}\cos(x^3) = 3x^2 \cdot \left(-\sin(x^3)\right)$$

$$= -3x^2 \sin(x^3)$$

Sep 20-7:23 PM

$$\frac{d}{dx} f(g(x)) = g'(x) \cdot f'(g(x))$$

chain rule

Sep 21-10:08 AM

If a particle moves along the x-axis so that its position is given by x(t)=cos(t^2+1), find the velocity.

$$x = \cos(t^2+1)$$

$$v = -2t \sin(t^2+1)$$

Sep 20-7:33 PM

Find dy/dx:

$y=\sin(x^2+x)$ $y'=(2x+1)\cos(x^2+x)$

$y=\sin^5 x = (\sin x)^5$ $y'=\cos x \cdot 5(\sin x)^4$

In: $\sin x$
out: x^5 der: $5x^4$

$y=(x^3+2x-1)^4$

in x^3+2x-1 der $3x^2+2$
out x^4 der $4x^3$

$y'=(3x^2+2)4(x^3+2x-1)^3$

$y=(x^3-x)^5\sin(3x)$

$y'=(x^3-x)^5 \cdot 3\cos(3x)+\sin(3x)\cdot(3x^2-1)5(x^3-x)^4$

Sep 20-7:35 PM

Oct 11-3:19 PM